Chrome Bay and Kachemack Bay Jonit ADEC AKMAP and NOAA Sediment Quality Assessment Summer 2009

Background

AKMAP South-central Coastal Survey in 2002 encountered the highest sediment chromium and nickel concentrations, respectively 1,320 and 756 µg/g, at Chrome Bay on the Kenai Peninsula (Figure 1). NOAA sediment quality Effects Range Median for chromium and nickel are 370 and 52 µg/g. Between 1916 – 1918 chromite ore was mined at Claim Point, adjacent Chrome Bay. There is a potential that either natural erosion of the source ore or tailings leftover in the nearshore environment have created these high levels of Cr and Ni. The AKMAP 2002 survey assessed status for the larger region, but not the extent or range of sediment trace metals Chrome Bay. The AKMAP 2002 report recommended that a targeted survey focus on assessing chromium and nickel sediment levels, macroinvertebrate and fish tissue levels at Chrome Bay.

EPA National Survey funding did not support a follow-up assessment. In 2009, Doug Dasher, met with Ian Hartwell, NOAA Chief Scientist - Bioeffects Projects, to discuss a possible partnership effort for the summer of 2009. NOAA started a detailed sediment assessment effort in Kachemack Bay in 2008, partnering with CIRCA for Phase I. NOAA did not have a partner for the 2009 effort needed to complete the survey. A DEC partnership with NOAA would provide for additional sampling at Chrome Bay and allow further comparison with other bays in lower Kachemack Bay.

DEC's contribution to this partnership includes AKMAP staff; Doug Dasher and Terri Lomax, funding to support sediment trace metal and macroinvertebrate analysis at approximately 27 sampling sites. Six sites are focus on Chrome Bay and include sediment toxicity bioassays, and fish sampling. EH would analyze the fish tissue samples for metals. CIRCA is also supporting this effort by agreeing to analyze sediment samples for PAHs, TOC, and sediment grain size. NOAA is providing staff to assist in the sampling, study design, data interpretation and reporting, housing at the Kasitisna Bay Laboratory, sampling equipment, and vessel support.

Objectives

Except for Chrome Bay, a stratified random statistical design will be used in selecting the sample sites. General sample locations are shown in Figure 2. In Chrome Bay the sampling plan will be based on a transect leading away from a known heavy metals source from historical industrial mining operations. Sediment subsamples will be collected for physical characterization, comprehensive chemical analyses, and benthic macroinvertebrate analysis; in addition, basic water quality parameters will be measured. The project is using EPA National Coastal Assessment and NOAA National Status and Trends QAPP and field methods.

This project will 1) help to identify natural and anthropogenic stressors that influence habitat quality and affect infaunal community spatial distribution; 2) provide chemical concentrations for a suite of trace metals; and 3) produce a comprehensive taxonomic list and distribution of infaunal species in soft bottom substrates. AKMAP will utilize the results better understand how to integrate different sampling methodologies into the coastal survey program.

Benefits to ADEC

This AKMAP, NOAA and CIRCA partnership provides DEC the opportunity to:

- Develop further information on Chrome Bay to help assess water quality status and potential impairment.
- Assess additional bays within Kachemack Bay for sediment quality.
- Develop ways to integrate targeted surveys with AKMAP probabilistic surveys.
- Evaluate potential impacted sites, such as Chrome Bay, Homer Boat Harbor and POTW discharge area, for bio-effects and bio-indicator development.
- Establish a partnership with NOAA for future coastal assessment efforts in Alaska.
- Maintain our existing partnership with CIRCA.
- Provide the datasets for input into STORET.

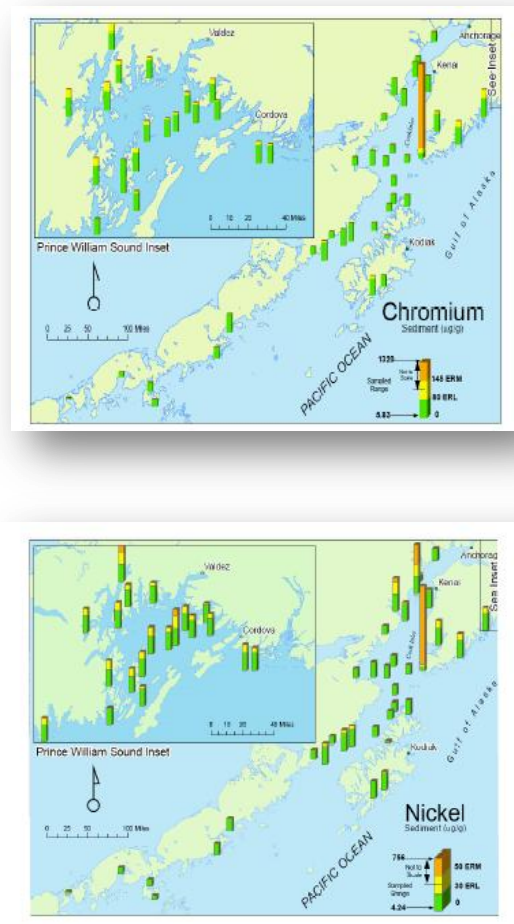**Figure 1 – AKMAP 2002 South-central Sediment Chromium and Nickel Concentrations**

Figure 2 – 2010 General Sample Locations